IN THE DRAWINGS

The attached 4 sheets of drawings label Figs. 1, 2, 12 and 13 as "Prior Art."

Attachment: Replacement Sheet

REMARKS

Favorable reconsideration of the present application is respectfully requested.

Claim 3 has been canceled and the subject matter thereof has been incorporated into Claim 1. Claims 4-10 have been canceled. New claims 11-14 recite that the steering actuator imparts a steering reaction force to the steering wheel based on the sum of the reaction force signal and the virtual contact resistance force signal. Basis for this is found in Equation 1 on page 11 of the specification.

It has been known to provide a reaction force to the driver in an electric steering system by taking into account the steering torque and a current command value I_n being provided to the vehicle wheel steering motor 6 (Fig. 12). In this case, the output current I_n to the wheel steering motor 6 is increased at the actual physical end of movement position of the steering wheel to provide a virtual contact resistance force corresponding to the end of movement of the steering wheel shaft. However, this can result in an excessively large command value I_n to the steering motor 6, resulting in heat build-up or damage in the motor (page 3, lines 14-21).

According to a feature of the invention set forth in new Claim 11, on the other hand, the steering actuator imparts a steering reaction force to the steering wheel based upon the sum of the reaction force signal from the reaction force control means and a virtual contact resistance force signal from an end of movement reaction force generation control means. For example, the reaction force motor 4 in Figs. 3 and 5 receives signal i_1 from the reaction force control portion 5 and signal i_2 from the end reaction force control portion 20 (21), which signals are summed to provide the steering reaction force (equation 1; step 850 in Fig. 8). Since i_2 does not affect the steering motor 6, heat build-up or damage in the motor is avoided.

Claims 1-10 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. patent 5,247,441 (Serizawa et al.) It is respectfully submitted, however, that Claims 11-14 define over this reference.

Serizawa et al. is concerned with ensuring that the vehicle operator will know when the end of movement limit of the steering wheel has been reached. Accordingly, Serizawa et al. provides that the steering reaction force is sharply increased or oscillated when such end of movement has been reached. Therefore, when the end of movement limit is recognized, a maximum steering reaction force T_{lim} is substituted into the steering reaction force T at step S30 so that the torque is sharply increased (col. 8, lines 11-35). More particularly, Serizawa et al. is similar to the prior art of Figure 12 in that the reaction force motor receives a single signal which sharply increases in the vicinity of the end of movement. However, there is no description in Serizawa et al. of an end of movement reaction force generating means which generates a virtual contact resistance force signal, wherein the signal actuator imparts a steering reaction force to the steering wheel based upon the sum of the virtual contact resistance force signal and reaction force signal from a reaction force controller which generates a signal based upon the steering angle. Claims 11-14 therefore define over the prior art.

Claim 1 now incorporates the subject matter of Claim 3. Claim 1 therefore recites that the steering angle threshold value variation unit dynamically changes the upper limit point and lower limit point of the permissible range based upon the vehicle speed, as is exemplified at Step 830 in Figure 8, for example in reliance on a map such as that of Figure 9. This is not taught in Serizawa et al. The maximum steering angle θ_{Hlim} of Serizawa et al is described at lines 11-35 in col. 8 of the reference and is a fixed value. There is no description that the maximum steering angle θ_{Hlim} is dependent on vehicle speed.

Applicants note that the Examiner has evidently relied upon lines 1-25 of col. 5 to teach the claimed speed dependent feature. However, it is further noted that this portion of Serizawa et al only describes that certain coefficients C_x and d_1 are related to the vehicle speed. *Coefficients C_x and d_1 are, however, not relied upon for the determination of the maximum steering angle θ_{Hlim} – which is fixed -- but are only used for computing the yaw rate response of the steering system (col. 5, lines 27-44).* Claim 1 therefore clearly defines over this reference.

The drawings have been amended to label Figs. 1, 2, 12 and 13 as prior art. Concerning the objection to the specification, it is noted that incorporation by reference of the foreign priority application is specifically permitted. M.P.E.P. § 201.13(II)(G).

Applicants therefore believe that the present application is in a condition for allowance and respectfully solicit an early notice of allowability.

Respectfully submitted,

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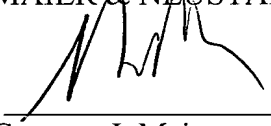

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